

Federal Register Notice
Determination of Threatened Status of the Pacific Coast Population
of the Western Snowy Plover March 5, 1993

DEPARTMENT OF THE INTERIOR (DOI)
United States Fish and Wildlife Service (FWS)
50 CFR Part 17
Final Rule: Endangered and Threatened Wildlife and Plants;
Determination of Threatened Status for the Pacific Coast Population of
the Western Snowy Plover / RIN 1018-AB73
Contact: Karen Miller, 916-978-4866
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Rules and Regulations
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DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

RIN 1018-AB 73

Endangered and Threatened Wildlife and Plants; Determination of
Threatened Status for the Pacific Coast Population of the Western
Snowy Plover

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule.

SUMMARY: The U.S. Fish and Wildlife Service (Service) determines
threatened status for the Pacific coast population of the western
snowy plover (*Charadrius alexandrinus nivosus*), pursuant to the
Endangered Species Act of 1973, as amended (Act). The Pacific coast
breeding population of the western snowy plover extends from the State
of Washington to Baja California, Mexico, with the majority of
breeding birds found in California. These plovers winter primarily in
coastal California and Mexico. The coastal population of the western
snowy plover is threatened throughout its range by loss and
disturbance of nesting sites. The final decision on determination of
critical habitat is postponed in accordance with section
4(b)(6)(C)(ii) of the Act. This rule implements the Federal protection
and recovery provisions afforded by the Act for this species.

EFFECTIVE DATE: April 5, 1993.

ADDRESSES: The complete file for this rule is available for public
inspection, by appointment, during normal business hours at the U.S.
Fish and Wildlife Service, 2800 Cottage Way, room E-1803, Sacramento,
CA 95825-1846.

FOR FURTHER INFORMATION CONTACT: Karen J. Miller, at the above address
(916-978-4866).

Background

Taxonomy

The snowy plover is a small, pale colored shorebird with dark patches on either side of the upper breast. The species was first described in 1758 by Linnaeus (American Ornithologists' Union 1957). Twelve subspecies of the snowy plover occur worldwide (Rittinghaus 1961 in Jacobs 1986).

Two subspecies of the snowy plover are recognized in North America (American Ornithologists' Union 1957). Those are the western snowy plover (*Charadrius alexandrinus nivosus*) and the Cuban snowy plover (*C. a. tenuirostris*). According to the American Ornithologists' Union (1957), the western snowy plover breeds on the Pacific coast from southern Washington to southern Baja California, Mexico, and in interior areas of Oregon, California, Nevada, Utah, New Mexico, Colorado, Kansas, Oklahoma and north-central Texas, as well as coastal areas of extreme southern Texas, and possibly extreme northeastern Mexico. Although previously observed only as a migrant in Arizona, small numbers have bred there in recent years (Monson and Phillips 1981, Davis and Russell 1984 in Page et al. 1991). The Cuban snowy plover breeds along the Gulf coast from Louisiana to western Florida and south through the Caribbean. The subspecific status of populations breeding east of the Rocky Mountains has been questioned (Johnsgard 1981, Jacobs 1986). These populations are considered to belong more appropriately to the subspecies *tenuirostris*.

The Pacific coast population of the western snowy plover is defined as those individuals that nest adjacent to or near tidal waters, and includes all nesting colonies on the mainland coast, peninsulas, offshore islands, adjacent bays, and estuaries.

The Pacific coast population of the western snowy plover is genetically isolated from western snowy plovers breeding in the interior (Gary Page, Point Reyes Bird Observatory, pers. comm., 1990). Intensive banding and monitoring studies have documented only two instances of intermixing between coastal and interior populations. First, a single banded female hatched at Monterey Bay was observed nesting the following year at Mono Lake, California (Gary Page, in litt., 1989). This one observation was among 1,730 plovers observed at the interior site. Second, a late summer nesting plover at Monterey was observed the following year nesting at a Central Valley site (Gary Page, pers. comm., 1992). Three snowy plovers banded as chicks on the California coast were observed at interior Oregon breeding sites during the breeding season in 1990 (Stern et al. 1991a). No nesting, however, was documented. Conversely, no plovers banded at interior sites in Oregon, California, and Utah (1,434 birds) have been observed breeding at any coastal site (Stern et al. 1990a; Gary Page, pers. comm.). In addition, snowy plovers tend to be site faithful, with the majority of birds returning to the same nesting location in subsequent years (Warriner et al. 1986).

Life History

The Pacific coast population of the western snowy plover breeds primarily on coastal beaches from southern Washington to southern Baja California, Mexico. Nesting habitat is unstable and ephemeral as a result of unconsolidated soil characteristics influenced by high winds, storms, wave action, and colonization by plants. Other less common nesting habitat includes salt pans, coastal dredged spoil disposal sites, dry salt ponds, and salt pond levees (Widrig 1980, Wilson 1980, Page and Stenzel 1981). Sand spits, dune-backed beaches, unvegetated beach strands, open areas around estuaries, and beaches at river mouths are the preferred coastal habitats for nesting (Stenzel et al. 1981, Wilson 1980).

Based on the most recent surveys, a total of 28 snowy plover breeding sites or areas currently occur on the Pacific Coast of the United States. Two sites occur in southern Washington -- one at Leadbetter Point, in Willapa Bay (Widrig 1980), and the other at Damon Point, in Grays Harbor (Anthony 1985). In Oregon, nesting birds were recorded in 6 locations in 1990 with 3 sites (Bayocean Spit, North Spit Coos Bay and spoils, and Bandon State Park-Floras Lake) supporting 81 percent of the total coastal nesting population (Oregon Department of Fish and Wildlife, unpubl. data, 1991). A total of 20 plover breeding areas currently occur in coastal California (Page et al. 1991). Eight areas support 78 percent of the California coastal breeding population: San Francisco Bay, Monterey Bay, Morro Bay, the Callendar-Mussel Rock Dunes area, the Point Sal to Point Conception area, the Oxnard lowland, Santa Rosa Island, and San Nicolas Island (Page et al. 1991).

Snowy plovers breed in loose colonies with the number of adults at coastal breeding sites ranging from 2 to 318 (Page and Stenzel 1981; Oregon Department of Fish and Wildlife 1990; Eric Cummins, Washington Department of Wildlife, pers. comm., 1991; James Atkinson, U.S. Fish and Wildlife Service, pers. comm., 1991). On the Pacific coast, larger concentrations of breeding birds occur in the south than in the north, suggesting that the center of the plovers' coastal distribution lies closer to the southern boundary of California (Page and Stenzel 1981). The Center of Scientific Investigation and Higher Education in Ensenada, Baja California, Mexico, observed snowy plovers distributed across 28 sites in Baja California in May, 1991. A total of 314 pairs were counted. The birds were concentrated at six coastal lakes (Dra. Graciela De La Graza Garcia, Director General of Conservation Ecology and Natural Resources, United States of Mexico, in litt., 1992). The Mexican government also reported a small number of sightings of snowy plovers on the mainland coast of Sinaloa in April 1992 (Dra. Graciela De La Graza Garcia, in litt., 1992).

Nest sites typically occur in flat, open areas with sandy or saline substrates; vegetation and driftwood are usually sparse or absent (Widrig 1980, Wilson 1980, Stenzel et al. 1981). The majority of snowy plovers are site-faithful, returning to the same breeding site in subsequent breeding seasons. Birds often nest in exactly the same locations as the previous year (Warriner et al. 1986).

The breeding season of the coastal population of the western snowy plover extends from mid March through mid September. Nest initiation and egg laying occurs from mid March through mid July (Wilson 1980, Warriner et al. 1986). The usual clutch size is three eggs. Incubation averages 27 days (Warriner et al. 1986). Both sexes incubate the eggs.

Plover chicks are precocial, leaving the nest within hours after hatching to search for food. Fledging (reaching flying age) requires an average of 31 days (Warriner et al. 1986). Broods rarely remain in the nesting territory until fledging (Warriner et al. 1986, Stern et al. 1990b).

Snowy plovers will renest after loss of a clutch or brood (Wilson 1980, Warriner et al. 1986). Double brooding and polygamy (i.e., the female successfully hatches more than one brood in a nesting season with different mates) have been observed in coastal California (Warriner et al. 1986) and also may occur in Oregon (Jacobs 1986). After loss of a clutch or brood or successful hatching of a nest, plovers may renest in the same colony site or move, sometimes up to several hundred miles, to other colony sites to nest (Gary Page, pers. comm., 1991; Warriner et al. 1986).

Widely varying nest success (percentage of nests hatching at least one egg) and reproductive success (number of young fledged per female, pair, or nest) are reported in the literature. Nest success ranges from 0 to 80 percent for coastal snowy plovers (Widrig 1980, Wilson 1980, Saul 1982, Wilson-Jacobs and Dorsey 1985, Wickham unpubl. data in Jacobs 1986, Warriner et al. 1986). Instances of low nest success have been attributed to a variety of factors, including predation, human disturbance, and inclement weather conditions. Reproductive success ranges from 0.05 to 2.40 young fledged per female, pair, or nest (Page et al. 1977, Widrig 1980, Wilson 1980, Saul 1982, Warriner et al. 1986, Page 1988). Page et al. (1977) estimated that snowy plovers must fledge 0.8 young per female to maintain a stable population. Reproductive success falls far short of this threshold at many nesting sites (Widrig 1980, Wilson 1980, Warriner et al. 1986, Page 1988, Page 1990).

The coastal population of the western snowy plover consists of both resident and migratory birds. Some birds winter in the same areas used for breeding (Warriner et al. 1986, Wilson-Jacobs, pers. comm. in Page et al. 1986). Other birds migrate either north or south to wintering areas (Warriner et al. 1986). Plovers occasionally winter in southern coastal Washington (Brittall et al. 1976). An average of 68 plovers may winter in Oregon, primarily on 3 beach segments (Oregon Department of Fish and Wildlife 1990 and in litt., 1992). The majority of birds, however, winter south of Bodega Bay, California (Page et al. 1986). Wintering plovers occur in widely scattered locations on both coasts of Baja California and significant numbers have been observed on the mainland coast of Mexico at least as far south as San Blas, Nayarit (Page et al. 1986). Many interior birds west of the Rocky Mountains winter on the Pacific coast (Page et al. 1986, Stern et al. 1988). Birds winter in habitats similar to those used during the nesting season.

Snowy plovers forage on invertebrates in the wet sand and amongst surf-cast kelp within the intertidal zone; in dry, sandy areas above the high tide; on salt pans; spoil sites; and along the edges of salt marshes and salt ponds. Little quantitative information is available on food habits (Reeder 1951).

Poor reproductive success, resulting from human disturbance, predation, and inclement weather, combined with permanent or long-term loss of nesting habitat to encroachment of introduced European

beachgrass (*Ammophila arenaria*) and urban development has led to a decline in active nesting colonies, as well as an overall decline in the breeding and wintering population of the western snowy plover along the Pacific coast of the United States.

Previous Service Action

On March 24, 1988, the Service received a petition from Dr. J.P. Myers of the National Audubon Society to list the Pacific coast population of the western snowy plover as a threatened species under the Act. On November 14, 1988, the Service published a 90-day petition finding (53 FR 45788) that substantial information had been presented indicating the requested action may be warranted. At that time, the Service acknowledged that questions pertaining to the demarcation of the subspecies and significance of interchange between coastal and interior stocks of the subspecies remained to be answered. Public comments were requested on the status of the coastal population of the western snowy plover. A status review of the entire subspecies had been in progress since the Service's December 30, 1982, Vertebrate Notice of Review (47 FR 58454). In that notice, as in subsequent notices of review (September 18, 1985 (50 FR 37958); January 6, 1989 (54 FR 554)), the western snowy plover was included as a category 2 candidate. Category 2 candidates are species for which information now in possession of the Service indicates that proposing to list as endangered or threatened is possibly appropriate, but for which conclusive data on biological vulnerability and threat are not currently available to support proposed rules. The public comment period on the petition was closed on July 11, 1989 (54 FR 26811, June 26, 1989). The Service completed a status report on the western snowy plover in September 1989. Based on the best scientific and commercial data available and other comments submitted during the status review, the Service made a 12-month petition finding on June 25, 1990, that the petitioned action was warranted but precluded by other pending listing actions, in accordance with section 4(b)(3)(B)(iii) of the Act. On January 14, 1992 (57 FR 1443), the Service published a proposal to list the coastal population of the western snowy plover as a threatened species. With publication of this final rule, the Service now determines the Pacific coast population of the western snowy plover to be a threatened species.

Summary of Comments and Recommendations

In the January 14, 1992, proposed rule (57 FR 1443) and associated notifications, all interested parties were requested to submit factual reports or information that might contribute to development of a final listing decision. Appropriate State agencies, county and city governments, Federal agencies, scientific organizations, and other interested parties were contacted and requested to comment. Newspaper notices were published in the Register Guard, News Times, Daily Astorian, The Oregonian, The Courier, Seaside Signal, The World, Columbia Press, Statesman-Journal, and Headlight Herald on January 30, 1992, the San Francisco Chronicle and San Jose Mercury News on February 3, 1992, the Oakland Tribune and Times-Standard on February 4, 1992, the Willapa Harbor Herald on February 5, 1992, the Daily World and Fort Bragg Advocate-News on February 6, 1992, the Triplicate and Chinook Observer on February 11, 1992, and the North Coast News on February 12, 1992, all of which invited public comment.

On March 2, 1992, the Service received a written request for a public hearing from Mr. John Thomas, Jr., a private citizen residing in Monmouth, Oregon. As a result, the Service published a notice of public hearing on August 3, 1992 (57 FR 34100), and reopened the comment period until August 31, 1992. Newspaper notices of the public hearing were published in the Daily Olympian, The Oregonian, the San Francisco Chronicle, and the Los Angeles Times on August 3, 1992, all of which invited general public comment. A public hearing was conducted at the Hatfield Marine Science Center in Newport, Oregon on August 18, 1992. Testimony was taken from 6 p.m. to 7:25 p.m. Six individuals testified at the hearing.

During the comment periods, the Service received 96 comments (i.e., letters and oral testimony) from 80 individuals or agencies. Of the 58 commenters that stated a position, 45 (78 percent) supported listing and 13 (22 percent) did not.

Support for the listing was expressed by one Federal agency, five State agencies, two local agencies, and 37 other interested parties. Of the State agencies responding favorably, the Washington Department of Wildlife, Oregon Department of Fish and Wildlife, and California Department of Parks and Recreation indicated strong support for listing. The Oregon Parks and Recreation Department indicated support for the listing with protection of public access rights. The California Department of Fish and Game indicated a shared interest with the Service in protecting the western snowy plover. Fifteen respondents, including the Oregon Department of Fish and Wildlife, expressed their support for endangered rather than threatened status. The Service also received two informal petitions containing 62 signatures favoring listing of the Pacific coast population of the western snowy plover. The Mexican government expressed an interest in obtaining information that would aid protection of the species in Baja California, Mexico.

Opposition to the listing was expressed by one State assemblyman, three local agencies, and nine other interested parties. Of those respondents indicating no position on the listing, many expressed concern regarding the impact of listing.

Several commenters provided additional information on the threats facing the species. Some agencies provided information on existing actions that are currently underway to help protect the species. These comments have been incorporated into the final rule. A number of commenters suggested particular strategies to help recover the species, commented on the benefits and problems associated with various recovery techniques, made recommendations for the establishment of a recovery team, or generally provided comments on ways to manage the species. Many agencies and organizations requested participation in recovery actions. These comments will be useful to the Service during the recovery planning process and will be fully considered at that time.

Written comments and oral statements obtained during the public hearing and comment periods are combined in the following discussion. Opposing comments and other comments questioning the rule can be placed in 10 general groups based on content. These categories of comment, and the Service's response to each, are listed below.

Issue 1: Critical Habitat

Comment: Several commenters were concerned about the designation of critical habitat. Eight commenters were concerned that critical habitat would not be designated and urged the Service to move forward in this endeavor. One private landowner asked that her property be included as critical habitat. Several commenters felt that enough information is presently available to designate critical habitat.

These commenters believed that by stating that critical habitat is not presently determinable, the Service is attempting to exempt itself from the designation of critical habitat. The California Department of Parks and Recreation supported designation of critical habitat and stated that this designation would enable the Department to more effectively control levels of recreation use and removal of exotic plants and animals. Other agencies supporting designation of critical habitat included the Oregon Department of Fish and Wildlife, Washington Department of Wildlife, and the Portland and Seattle Districts of the Corps of Engineers.

Conversely, two respondents recommended against designation of critical habitat, with one in favor of critical habitat designation only on Federal lands.

Service Response: Section 4(a)(3) of the Act requires, to the maximum extent prudent and determinable, that the Secretary designate critical habitat at the time a species is determined to be threatened or endangered. Critical habitat for the coastal population of the western snowy plover is not determinable at this time primarily because additional information is needed to analyze nesting habitat, wintering habitat, and the economic effects of a critical habitat designation. However, when a "not determinable" finding is made under section 4(b)(6)(C)(ii), the Service must to the maximum extent prudent within 2 years of the publication date of the proposed rule designate critical habitat. Any proposal to designate critical habitat would be published in the Federal Register including maps and legal descriptions of all areas included in the proposal, and would solicit public comments. The potential economic impacts of critical habitat designation would be evaluated during preparation of the required economic analysis.

While the Service continues to evaluate the appropriateness of designating critical habitat, it will use some of the information provided in response to the proposed rule regarding potential areas of critical habitat. The Service will solicit information from the public on any proposed designation of critical habitat.

Critical habitat, as defined by section 3 of the Act, includes all specific areas occupied by the species at the time of its listing that are essential to its conservation. Areas not presently occupied by the species also may be designated as critical habitat if such areas are essential for the conservation of the species. Substantial habitat for the coastal population of the western snowy plover occurs on State and private lands, particularly in California, where the majority of the nesting population exists. In addition to Federal lands, State, municipal and privately-owned land may be designated as critical habitat, if such designation would benefit the species.

Comment: Several commenters provided information on factors to

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consider in the designation of critical habitat, such as the spatial arrangement of areas to be designated, size of the areas, and target number of birds to be included in such areas.

Service Response: These comments have been noted and will be considered in the Service's determination on the designation of critical habitat for the species.

Comment: Several commenters provided predictions on the effect of critical habitat designation on the economy, including economic impacts to Coos Bay, Oregon, the San Francisco Bay area, and the activities of the Oregon Department of Transportation. In addition, specific areas were requested to be exempt from critical habitat designation.

Service Response: The Service will fully consider these comments in any designation of critical habitat and in preparation of the accompanying economic analysis.

Issue 2: National Environmental Policy Act

Comment: One commenter stated that the designation of critical habitat and the proposal to list the Pacific coast population of the western snowy plover may fall within the purview of the National Environmental Policy Act (NEPA). This commenter stated that if an environmental analysis had been conducted on the proposal to list the plover, much of the information necessary for the designation of critical habitat would have already been assembled.

Service Response: For the reasons set out in the NEPA section of this document, the Service takes the position that rules issued pursuant to section 4(a) of the Endangered Species Act do not require preparation of an Environmental Assessment or Environmental Impact Statement (EIS). The decision in *Pacific Legal Foundation v. Andrus*, 657 F.2d 829 (6th Circuit 1981) held that as a matter of law an EIS is not required for listings under the Act. The decision noted that preparing EISs on listing actions would not further the goals of NEPA or the Endangered Species Act.

Issue 3: Economic Effects of Listing

Comment: Several commenters expressed concern about an adverse effect on the economy of listing the Pacific coast population of the western snowy plover, including the effects of the listing on tourism and military training exercises. One commenter recommended that the Service do an economic analysis of the impact of listing the snowy plover as threatened. Several commenters expressed the opinion that people are more important than wildlife. One commenter stated that proposed solutions to protect the snowy plover should not include broad prescriptions against all industrial development. The Portland District of the Corps of Engineers stated that the costs to that agency of listing the species likely would be minimal unless the Corps was directed to develop and fund new nesting areas.

In contrast, one commenter stated that listing of the plover would have a positive effect on the economy. This commenter cited a proposed residential development in Oregon where the developers propose to

preserve an area for snowy plovers. The developers have viewed formation of a plover habitat area as a purchasing incentive for homeowners.

Service Response: Under section 4(b)(1)(A) of the Act, a listing determination must be based solely on the best scientific and commercial data available. The legislative history of this provision clearly states the intent of Congress to "ensure" that listing decisions are " * * * based solely on biological criteria and to prevent nonbiological considerations from affecting such decisions * * *" H.R. Rep. No. 97-835, 97th Cong., 2d Sess. 19 (1982). As further stated in the legislative history, " * * * economic considerations have no relevance to determinations regarding the status of species * * * " Id. at 20. Because the Service is specifically precluded from considering economic impacts, either positive or negative, in a listing determination, the Service is not responding to comments concerning possible economic consequences of listing the Pacific coast population of the western snowy plover. The Service, however, would be required to prepare an economic analysis in association with designation of critical habitat.

The Service will consider all existing regulatory mechanisms during the recovery planning process, and will consider a range of options in the preparation of a recovery strategy for the species. Comments on the approaches to habitat and species protection will be evaluated at that time.

Comment: Several commenters expressed concern that listing of the coastal population of the western snowy plover would prevent the construction or implementation of various projects. One commenter stated that the listing would hinder the safe operation, maintenance, and development of new facilities at an international airport governed by State and Federal regulation. The commenter requested that the Service consider an exemption procedure for federally-regulated airports. Another commenter stated that Federal agencies should prepare section 7 consultations on actions that would inhibit the continued operation of spoil disposal operations and salt manufacturing because these activities support significant populations of the snowy plover.

Service Response: Section 7 of the Act requires Federal agencies to insure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of a listed species or to destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into consultation with the Service. If the Service determines, through formal consultation, that a Federal action is likely to jeopardize the continued existence of a listed species, reasonable and prudent alternatives are provided by the Service.

Under section 7(g) of the Act, an applicant for a Federal permit or license can apply to the Secretary of the Interior for an exemption for an agency action if, after consultation with the Service, it is determined that the agency's action would violate section 7(a)(2) of the Act. Exemption procedures are outlined in section 7(g) through 7(p) of the Act.

The airport in question has supported in recent years a nesting colony of the federally endangered California least tern (*Sterna*

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antillarum brownii). Snowy plovers nest in the same area occupied by least terns. The airport has been successful in maintaining and safely operating its facilities despite the presence of an endangered species on the airport. If the Service determined, after consultation, that an action involving the subject airport would be likely to jeopardize the continued existence of the snowy plover and that there was no reasonable and prudent alternative to such action, the Federal agency responsible for regulating the airport's activities could apply for an exemption under section 7(g) of the Act.

Issue 4: Alternate Listing Status Recommended

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0*0*0* Comment: Several commenters recommended that the coastal population of the western snowy plover be listed as endangered rather than threatened, primarily because of precipitous declines in the population on the Oregon coast.

Service Response: The Service recognizes that the nesting population of snowy plovers has declined severely on the Oregon and Washington coasts. The majority of the population, however, nests in California where the decline in number of nesting birds has been less dramatic. New data received from the Mexican government during the comment period indicate that a significant number of plovers (about 314 pairs) nest on the Pacific coast of Baja California, Mexico. In addition, the approximate 17 percent population decline documented for the United States coastal population between 1977 and 1989 (Page et al. 1991) indicates that the current rate of decline in this population does not suggest the likelihood of extinction within the foreseeable future. For these reasons, the Service maintains that threatened status is warranted for the Pacific coast population of the western snowy plover.

Issue 5: Insufficiency of Scientific Data

Comment: Several commenters stated that the evidence was insufficient to prove that the Pacific coast population of the western snowy plover is distinct from interior western snowy plovers. One commenter requested information on interior population numbers and questioned the Service's authority to designate populations as threatened or endangered species.

Service Response: As stated above in the "Background" section of this rule, evidence of intermixing of coastal and interior populations is limited to two documented instances of banded snowy plovers from the coastal population breeding at interior sites (Gary Page, in litt., 1989, Gary Page, pers. comm., 1992). These observations were among over 1,700 birds observed at interior sites in California and Nevada. More importantly, no banded snowy plovers of the larger interior population have been recorded nesting on the coast (Stern et al. 1990a, Gary Page, pers. comm., 1992). Based on these data, the Service has determined that the Pacific coast population of the western snowy plover is distinct from interior populations.

The Service completed a status review on the western snowy plover in 1989. Based on this status report, the Service determined that listing of the interior population of the western snowy plover is possibly appropriate; however, conclusive data on biological

vulnerability and threat are not currently available to support a proposed rule. The interior population was designated as a category 2 candidate in the November 21, 1991, Animal Notice of Review (56 FR 58804).

Under section 3 of the Act, a "species" is defined as "any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature." Therefore, the Act allows for listing a population of a vertebrate species.

Comment: Several commenters stated that insufficient data were available to warrant listing the coastal population of the western snowy plover as a threatened species. Several commenters indicated that listing of the snowy plover was being done for political, rather than biological reasons.

Service Response: Section 4(b)(1)(A) of the Act, requires that a listing determination be based on the best scientific and commercial data available. The Service bases its determination on data collected over a period of 10 or more years by the Point Reyes Bird Observatory, the Oregon Department of Fish and Wildlife, the Washington Department of Wildlife, and other competent researchers. All data indicate a downward trend in the nesting population and number of nesting sites on the coast. The Service maintains that sufficient data are available to warrant listing the Pacific coast population of the western snowy plover as a threatened species.

Comment: One commenter stated that there is no scientific proof that European beachgrass or horseback riding has had any deleterious effect upon the coastal snowy plover population.

Service Response: European beachgrass, which is found at 50 percent of California snowy plover breeding sites and all of the Oregon and Washington breeding sites, eliminates potential snowy plover nesting habitat. The plant reduces the amount of unvegetated area above the surf line, the area where snowy plovers prefer to nest. As examples, at Willapa National Wildlife Refuge in Washington State, the Service documented between 1984 and 1990 invasion of European beachgrass into former snowy plover nesting areas (James Atkinson, pers. com m., 1992). A decline in the plover breeding population also occurred over this time period. In Oregon, at the Siuslaw National Forest, the U.S. Forest Service reports that European beachgrass has eliminated some of the historically open sand spits where snowy plovers formerly nested or wintered. Remaining birds are forced to use a greatly reduced habitat base (Robert D. Nelson, U.S. Forest Service, in litt., 1992). At the Pajaro River mouth in California, an ongoing decline in the breeding population of snowy plovers coincides with expansion of European beachgrass at this site (David Dixon, California Department of Parks and Recreation in litt., 1991). The Oregon Department of Fish and Wildlife (in litt., 1992) considers European beachgrass to be the primary reason for the decline of snowy plovers on the Oregon coast, with human disturbance a secondary factor in remaining habitat.

Interactions between nesting snowy plovers and horseback riders have been documented at Baker Beach, Oregon, by Woolington (1985), at Salinas River State Beach, California, by Page (1988), and at Morro Bay and Calendar-Mussel Rock Dunes, California, by Philip Persons (Point Reyes Bird Observatory, in litt., 1992). Continuous passage of

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horseback riders through nesting areas results in direct loss of nests or indirect loss from plovers repeatedly being flushed from their nests.

Issue 6: Species and Habitat Management

Comment: Two commenters stated that the Service should allow natural selection to take place and not interfere with nature's principle of survival of the fittest.

Service Response: The decline of the Pacific coast population of the snowy plover is largely due to unnatural events, such as the human-caused introduction of European beachgrass and the non-native red fox. Other successful predators are attracted to coastal beaches by trash left behind by recreationists. A species may not be able to adapt to modifications in its habitat caused by human-related activities. Adaptation is an evolutionary process requiring considerable time. To follow the principle of "survival of the fittest" and allow threatened or endangered species to go extinct would be contrary to the intent of Congress as stated in the purposes of the Act.

Comment: Several commenters stated that the snowy plover is opportunistic in finding breeding sites, and, therefore, there is no reason to believe that the population of the species will not move to better breeding sites as the environment changes from location to location.

Service Response: Data on the coastal population of the western snowy plover suggest that most birds are site faithful, returning to the same breeding site in subsequent years. In California, the lack of major storms during the recent five-year drought has resulted in an increase in potential dune-backed nesting habitat for plovers on several State beaches. This available habitat, however, has not been explored in all cases (Henry R. Agonia, California Department of Parks and Recreation, in litt., 1991). These data contradict the assertion that coastal nesting birds are opportunistic in locating nesting sites. In addition, because of the constant increase in human-related activities on Pacific coast beaches and the unchecked advancement of European beachgrass on many beaches, it is unlikely that snowy plovers displaced from one breeding site will be able to find suitable nesting sites at other locations.

Comment: One commenter advised that if predators prove to be the primary problem for plovers at Coos Bay, preservation efforts might be more wisely undertaken at nesting areas adjacent to less populated areas.

Service Response: The Coos Bay nesting colony on the North Spit is the largest remaining nesting colony in the State of Oregon. Predators are recognized as a significant factor in the reduced nesting success of plovers at this site. In response to this threat, the Oregon Department of Fish and Wildlife has been conducting nest enclosures experiments and has found these measures significantly increased nesting success. Because this nesting site is the largest in Oregon and is responding favorably to management, it would be inadvisable at this time to abandon this site in favor of applying management techniques only at nesting sites in less populated areas.

Comment: Many commenters provided advice on how snowy plover nesting areas should be managed, including prohibition or effective and enforceable regulation of foot, horseback, and vehicular traffic, control of cats and dogs, exclusion of researchers, creation of buffer areas adjacent to human activity centers, continuing education, use of nesting enclosures, predator control, beachgrass control and eradication using mechanical techniques and herbicides, removal of stabilization structures, careful placement of dredged spoils, garbage removal, and regular monitoring of bird numbers and distribution. Some of these comments suggested that the above management actions should be undertaken instead of listing the species. One commenter believed that barring vehicle traffic alone, as has been done at many beaches, is not enough to protect snowy plovers.

In contrast, one commenter was concerned that the above management actions were unnatural and did not follow proven science or the tenet of natural selection. Another commenter was concerned that other wildlife would be adversely impacted by management actions to protect snowy plovers.

Service Response: The Service will fully consider these as well as other possible management approaches when consultation and recovery actions are undertaken for the snowy plover. The Service considers the decline in the coastal population of the snowy plover to be primarily related to unnaturally factors, including the introduction of non-native vegetation and predators. When a species declines to the point of threatened or endangered status as a result of man-made factors, intensified management is scientifically warranted to reverse this unnatural population decline. The Service recognizes that localized populations of more common wildlife species may decline to a minor degree as a result of actions taken to protect the snowy plover.

Comment: One commenter felt that implementation of a cooperative predator control program in the San Francisco Bay area would be more effective in protecting the snowy plover than listing the species as threatened or endangered. The commenter felt that listing the species would destroy this cooperative spirit and not protect the species.

Service Response: The San Francisco Bay area supports the largest remaining nesting population of snowy plovers in coastal California. Despite the importance of this nesting region, and despite the lack of legal status for the snowy plover, no cooperative predator control programs have been launched to protect this species. Conversely, a cooperative predator control program is currently underway to protect the federally listed endangered California clapper rail (*Rallus longirostris obsoletus*) in the San Francisco Bay area. Based on this experience, the Service believes that listed species are more likely to be the recipients of cooperative protection ventures than species that are not listed.

Issue 7: Take Regulations

Comment: One commenter recommended that the Service concurrently developed and promulgate regulations are provided in the Act to define "take" of the species.

Service Response: The Service is considering the need to develop a precise definition of "take" for the Pacific coast population of the

western snowy plover.

Comment: One commenter suggested that all the Federal land on the west coast be reserved for snowy plovers, and that State, local and privately-owned land be exempt.

Service Response: The Endangered Species Act applies to all people and all lands regardless of ownership. Under section 9 of the Act, the prohibition against "take" of listed species is not based on land ownership. The requirements for Federal agencies under section 7 of the Act are discussed under Issue 3 and under the Available Conservation Measures section of this rule. Under section 10(a) of the Act, private landowners may apply for an incidental take permit and develop a habitat conservation plan for projects that take listed species incidental to otherwise lawful activities. An incidental take permit constitutes an exception to the prohibition against taking. Details of the procedures involved in applying for a section 10(a) permit may be found in 50 CFR 17.32(b). Federal land comprises 34 percent of snowy plover habitat in California, and 50 percent of plover habitat in Oregon and Washington. Because the majority of the nesting plover population occurs in California, protection of only 34 percent of the species' nesting habitat would not provide adequate protection for the coastal population of the western snowy plover.

Issue 8: Sequence of Listing Actions

Comment: Three commenters questioned why the northern spotted owl (*Strix occidentalis caurina*) and the marbled murrelet (*Brachyramphus marmoratus marmoratus*) were listed prior to the western snowy plover when the plover population is smaller than either of these species.

Service Response: The Service was petitioned to list the northern spotted owl in January, 1987, and the marbled murrelet in January, 1988. Both petitions preceded the petition to list the Pacific coast population of the western snowy plover.

In summary, no information was received indicating that the species is more widespread or under lesser threat than was previously thought.

Summary of Factors Affecting the Species

After a thorough review and consideration of all information available, the Service has determined that the Pacific coast population of the western snowy plover should be classified as a threatened species. Procedures found at section 4 of the Act (16 U.S.C. 1533) and regulations (50 CFR part 424) promulgated to implement the listing provisions of the Act were followed. A species may be determined to be an endangered or threatened species due to one or more of the five factors described in section 4(a)(1). These factors and their application to the Pacific coast population of the western snowy plover (*Charadrius alexandrinus nivosus*) are as follows:

A. The Present or Threatened Destruction, Modification, or Curtailment of Its Habitat or Range

Historic records indicate that nesting western snowy plovers were

once more widely distributed in coastal California, Oregon, and Washington than they are currently. In coastal California, snowy plovers bred at 53 locations prior to 1970 (Page and Stenzel 1981). Since that time, no evidence of breeding birds has been found at 33 of these 53 sites, representing a 62 percent decline in breeding sites (Page and Stenzel 1981). The greatest losses of breeding habitat were in southern California, within the central portion of the snowy plover's coastal breeding range. In Oregon, snowy plovers historically nested at 29 locations on the coast (Charles Bruce, Oregon Department of Fish and Wildlife, pers. comm., 1991). In 1990, only six nesting colonies remained, representing a 79 percent decline in active breeding sites. In Washington, snowy plovers formerly nested in at least five sites on the coast (Eric Cummins, pers. comm., 1991). Today only two colony sites remain active, representing, at minimum, a 60 percent decline in breeding sites.

In addition to loss of nesting sites, the plover breeding population in California, Oregon, and Washington has declined 17 percent between 1977 and 1989 (Page et al. 1991). Declines in the breeding population have been specifically documented in Oregon and California. Breeding season surveys of the Oregon coast from 1978 to 1992 show that the number of adult snowy plovers has declined significantly at an average annual rate of about 5 percent (calculated from Oregon Department of Fish and Wildlife data). The number of adults has declined from a high of 139 adults in 1981 to a low of 30 adults in 1992 (Oregon Department of Fish and Wildlife 1990, Charles Bruce, pers. comm., 1991, Randy Fisher, Oregon Department of Fish and Wildlife, in litt., 1992). If the current trend continues, breeding snowy plovers could disappear from coastal Oregon by 1999. In 1981, the coastal California breeding population of snowy plovers was estimated to be 1,565 adults (Page and Stenzel 1981). In 1989, surveys revealed 1,386 plovers (Page et al. 1991), an 11 percent decline in the breeding population. The population decline in California may be greater than indicated; the 1989 survey results are considered more reliable than the earlier estimates, which may have underestimated the overall population size (Gary Page, pers. comm., 1991).

Although there are no historic data for Washington, it is doubtful that the snowy plover breeding population in Washington was ever very large (Brittall et al. 1976). However, loss of nesting sites in this State probably has resulted in a reduction in overall population size. In recent years, fewer than 30 birds have nested on the southern coast of Washington (James Atkinson, pers. comm., 1990; Eric Cummins, pers. comm., 1991). In 1991, there was only one successful brood detected in the State (Tom Juelson, Washington Department of Wildlife, in litt., 1992).

Survey data also indicate a decline in wintering snowy plovers, particularly in southern California. The number of snowy plovers observed during Christmas Bird Counts from 1962 to 1984 significantly decreased in southern California despite an increase in observer participation in the counts (Page et al. 1986). This observed decline was not accompanied by a significant loss of wintering habitat over the same time period (Page et al. 1986).

The most important form of habitat loss to coastal breeding snowy plovers has been encroachment of European beachgrass (*Ammophila arenaria*). This non-native plant was introduced to the west coast around 1898 to stabilize dunes (Wiedemann 1987). Since then it has

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spread up and down the coast and now is found from British Columbia to southern California (Ventura County). European beachgrass is currently a major dune plant at about 50 percent of California breeding sites and all of those in Oregon and Washington (J.P. Myers, National Audubon Society, in litt., 1988). Stabilizing sand dunes with European beachgrass has reduced the amount of unvegetated area above the tideline, decreased the width of the beach, and increased its slope. These changes have reduced the amount of potential snowy plover nesting habitat on many beaches and may hamper brood movements. The beachgrass community also provides habitat for snowy plover predators which historically would have been largely precluded by the lack of cover in the dune community. In addition, the presence of beachgrass may adversely affect plover food supplies. The abundance and diversity of sand dune arthropods are markedly depressed in areas dominated by European beachgrass (Slobodchikoff and Doyen 1977).

Urban development also has contributed significantly to the loss of snowy plover breeding sites. The construction of residential and industrial developments, and recreational facilities, including placement of access roads, parking lots, summer homes, and supportive services, have permanently eliminated valuable nesting habitat on beaches in southern Washington (Brittall et al. 1976), Oregon (Oregon Department of Fish and Wildlife 1990), and California (Page and Stenzel 1981). Snowy plover use of man-made habitat, such as salt evaporators and dredged spoil sites, apparently has not compensated for loss or degradation of habitat in other areas (Page and Stenzel 1981).

Sand mining operations at numerous locations in California also may be eliminating potential snowy plover habitat by interrupting buildup of the sand profile (David Dixon, in litt., 1991). Stabilization efforts also may interrupt this process, resulting in beach erosion and loss of plover nesting habitat.

In the habitat remaining for snowy plover nesting, human activity (e.g., walking, jogging, running pets, horseback riding, off-road vehicle use, and beach raking) is a key factor in the ongoing decline in snowy plover coastal breeding sites and breeding populations in California, Oregon, and Washington. Snowy plovers also are subjected to similar high levels of human disturbance at nesting sites in Baja California, Mexico (Barbara Massey, Proesteros, pers. comm., 1990; Daniel Anderson, University of California, Davis, pers. comm., 1990). With 81 percent of the Oregon snowy plover population supported at three of six remaining nesting sites and 78 percent of the California population breeding in eight areas, loss of just a few of these sites could dramatically reduce the coastal plover population.

In all of Los Angeles County and parts of Orange County, California, entire beaches are raked on a daily to weekly basis to remove trash and tidal debris. Even if human activity was low on these beaches, grooming activities completely preclude the possibility of successful nesting attempts (Stenzel et al. 1981). Plover food availability on raked beaches also may be depressed for both breeding and wintering birds, because surf-cast kelp and associated invertebrates are removed and the upper centimeter of the sand substrate is disturbed (J.P. Myers, in litt., 1988).

B. Overutilization for Commercial, Recreational, Scientific, or

Educational Purposes

Egg collecting has been observed at several California nesting colonies (Stenzel et al. 1981, Warriner et al. 1986). The significance of this factor on nesting success is unknown.

C. Disease or Predation

Western snowy plover eggs, chicks, and adults are taken by a variety of avian and mammalian predators. These losses, particularly to avian predators, are exacerbated by human disturbances. Of the many predators, American crows (*Corvus brachyrhynchos*), ravens (*C. corax*), and red fox (*Vulpes vulpes*) have had a significantly adverse effect on reproductive success at several colony sites. Because crows and ravens, in particular, thrive in urban/agricultural areas, present day coastal populations of these species are probably greater than historic populations. Accumulations of trash at beaches attracts these as well as other predators, including striped skunks (*Mephitis mephitis*), gulls (*Larus* sp.), and raccoons (*Procyon lotor*) (Stern et al. 1990b, Hogan 1991). At nesting sites on the Oregon coast, nest losses of up to 68 percent have been attributed to crows and ravens (Wilson-Jacobs and Meslow 1984, Stern et al. 1991b). Ravens were also significant predators at a Point Reyes breeding site, destroying 67 to 69 percent of the clutches in 1988 to 1989 (Page 1988, 1990). In recent years, concern has increased regarding loss of snowy plover nests to the introduced eastern red fox. The fox apparently now occurs throughout a significant portion of coastal California, including the Monterey Bay area (John and Jane Warriner, point Reyes Bird Observatory, in litt., 1989), San Francisco Bay (Leora Feeney, Biological Field Services, pers. comm., 1991), Orange County, (Gary Page, in litt., 1988), and Ventura, Los Angeles, and Santa Barbara Counties (Ronald Jurek, California Department of Fish and Game, pers. comm., 1992). At the Marina breeding site in Monterey Bay, red fox destroyed 45 percent of the nests in 1988 (Page 1988). This predator was also the likely cause of nest failures at least three other breeding sites in Monterey Bay in 1989 to 1990 (Page 1990). In the Salinas River area, the number of chicks fledged between 1984 and 1989 was reduced by 75 percent as red fox expanded into the area (John and Jane Warriner, in litt., 1989).

Although predation represents an important mortality factor at several colony sites, the significance of predation on the overall coastal population of the snowy plover is unknown. Nevertheless, this factor remains an issue of concern, particularly as it relates to the non-native red fox, which represents a severe and spreading threat to nesting snowy plovers.

D. The Inadequacy of Existing Regulatory Mechanisms

The western snowy plover is protected by the Federal Migratory Bird Treaty Act (16 U.S.C. 703 et seq.) and by State law as a nongame species. The plover's breeding habitat, however, receives only limited protection from these laws; e.g., Migratory Bird Treaty Act prohibition against taking "nests." 16 U.S.C. 703.

In the State of Washington, the western snowy plover was listed as an endangered species in 1981 by the Wildlife Commission. This

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designation, however, does not provide for consultation between the Department of Wildlife and other State agencies regarding impacts of proposed projects on the snowy plover. Preparation of a recovery plan for the snowy plover is required by 1995 under State law. A recovery plan for the snowy plover, however, has not yet been developed. There are also no penalties imposed under Washington law for take of endangered species habitat. At the Damon Point site, the Department of Wildlife has entered into an agreement with other agencies to provide some protection for nesting plovers.

In Oregon, the plover was listed as a threatened species in 1975. The Oregon Threatened and Endangered Species Act of 1987 requires other State agencies to consult with the Department of Fish and Wildlife. The State Act, however, does not provide adequate protection for either the birds or their habitat. A management and recovery plan for the snowy plover in Oregon is currently being developed (Oregon Department of Fish and Wildlife 1990, Martin Nugent, Oregon Department of Fish and Wildlife, pers. comm., 1992). Although protective measures are being implemented on an experimental basis at some nesting sites (Charles Bruce, pers. comm., 1990) and many beaches have been closed to vehicles, a comprehensive conservation program has yet to be implemented in this State. At Coos Bay, an estuary management plan requires no net loss of plover habitat in conjunction with industrial development of the North Spit. In 1993, the Oregon Fish and Wildlife Commission will consider upgrading the snowy plover to endangered status.

In California, where the majority of nesting occurs, the snowy plover is classified as a "Species of Special Concern" (Remsen 1978). This designation provides no special, legally mandated protection. Vehicle closures have been effective in protecting nesting snowy plovers on some State beaches (W. David Shuford, Point Reyes Bird Observatory, in litt., 1989, Henry R. Agonia, California Department of Parks and Recreation, in litt., 1991), but have been ineffective at other beaches because of a lack of enforcement (P. Persons, in litt., 1992). Aside from the Migratory Bird Treaty Act, snowy plovers have no protection status in Mexico.

Section 404 of the Clean Water Act and section 10 of the Rivers and Harbors Act are the primary Federal laws that could provide some protection of nesting and wintering habitat of the western snowy plover that is determined by the U.S. Army Corps of Engineers (Corps) to be wetlands or historic navigable waters of the United States. These laws, however, would apply to only a small fraction of the nesting and wintering areas of the western snowy plover on the Pacific coast.

In 1985, the Nongame Program of the Service prepared management guidelines for the western snowy plover (Fish and Wildlife Service 1985), which included strategies to reduce human disturbance at nesting sites, and prevent structural alteration of breeding habitat. Some management actions have been carried out since publication of the guidelines, but major strategies have yet to be implemented.

E. Other Natural or Man-made Factors Affecting its Continued Existence

Human activity, as mentioned previously, is a key factor in the ongoing decline in snowy plover coastal breeding sites and breeding populations. The nesting season of the western snowy plover (mid-March

to mid-September) coincides with the season of greatest human use on beaches of the west coast (Memorial Day through Labor Day). Human activities of particular detriment to nesting snowy plovers include unintentional disturbance and trampling of eggs and chicks by people (Stenzel et al. 1981, Warriner et al. 1986, P. Persons, in litt., 1992); off-road vehicle use (Widrig 1980, Stenzel et al. 1981, Anthony 1985, Warriner et al. 1986, Page 1988, Philip Persons, in litt., 1992); horse-back riding (Woolington 1985, Page 1988, Philip Persons, in litt., 1992); and beach raking (Stenzel et al. 1981). Page et al. (1977) found that snowy plovers were disturbed more than twice as often by such human activities than all other natural causes combined.

Intensive beach use by humans results in abandonment of nesting sites or reductions in nesting density or nesting success. In southern California where human activity on beaches is extensive, plover nesting is restricted to managed preserves. The reduction in the number of nesting plovers at South Beach on the Oregon coast may have been related to opening of a new State park adjacent to the beach (Wilson 1980). Nipomo Dunes beach in southern California, which receives high human use, including significant off-road vehicle activity, supported one-fifth the density of plover nests as occurred at Point Purisima beach, within Vandenberg Air Force Base (closed to public use) (Stenzel et al. 1981). This relationship held true even though nesting habitat at Nipomo Dunes was of higher quality than that at Point Purisima. Hatching success was found to be much lower on Zmudowski State Beach in Monterey County, California, than on an undisturbed salt pan just 1 kilometer (km) away (Warriners, unpubl. data in Page and Stenzel 1981).

In the few instances where human intrusion into snowy plover nesting areas has been precluded either through area closures or by natural events, nesting success has improved. The average number of young fledglings per nesting pair increased from 0.75 to 2.00 after the nesting site at Leadbetter Point, Washington, was closed to human activities (Saul 1982). Similarly, vehicle closure on a portion of Pismo Beach, California, led to an eight-fold increase in the nesting plover population (W. David Shuford, Point Reyes Bird Observatory, in litt., 1989). Fledgling success increased 16 percent at Moss Landing Beach, California, after beach access was virtually eliminated by the 1989 earthquake (Page 1990).

When beach visitors travel through plover nesting areas, plovers flush repeatedly. Incubating plovers at Point Reyes left their nests in response to human activity 65 to 78 percent of the time when disturbances occurred within 100 meters (m) or less of nests (Page et al. 1977). Dogs intimidated plovers even more, with plovers flushing more frequently and remaining off their nests significantly longer when disturbed by people with dogs versus people without dogs (Page et al. 1977).

Prolonged absences from the nest and the subsequent longer incubation period increase the likelihood of nest failures by prolonging exposure of eggs and nesting birds to predators (Page et al. 1983) and other detrimental factors. Human disturbance also may increase exposure of eggs or chicks to inclement weather. In an attempt to avoid intruders, adult snowy plovers have been observed leaving chicks wet and unattended in the rain (Wilson 1980) and allowing wind blown sand to bury their eggs (Charles Bruce, pers. comm., 1991). Prolonged absences from the nest on sunny days may

result in overheating of the eggs.

Researchers also have frequently observed chicks running long distances along beaches as they were unintentionally "herded" by people using the beach (Philip Persons, in litt., 1992). High levels of human disturbance may increase chick mortality by altering chick behavior. Frequently disturbed piping plover chicks fed less often and at a reduced rate (Fleming et al. 1988). Fewer chicks survived to 17 days in areas heavily disturbed by humans.

In addition to indirect effects, direct losses of chicks and adults also result from human activities. In the Monterey Bay area, two makes were found run over on their nests (J.P. Myers, in litt., 1988). Chicks and adults are particularly vulnerable because of their habit of crouching in depressions, such as tire tracks or footprints. Vehicle tracks have been noted in nesting areas at a number of beaches, including Dam on Point (Anthony 1985) and Leadbetter point (Widrig 1980) in Washington; New River (Wickham 1981) and Coos Bay (Oregon Department of Fish and Wildlife 1990) in Oregon; and Point Reyes (Page 1988), the Pajaro River mouth (Warriner et al. 1986), Morro Bay and Calendar-Mussel Rock Dunes (Philip Persons, in litt., 1992) in California. The Mexican government reported observing all terrain vehicle tracks in 15 of 28 breeding sites in Baja California, Mexico (Dra. Graciela De La Graza Garcia, in litt., 1992). On military bases, such as Camp Pendleton in California, plovers are directly and indirectly affected by military training exercises on the beach (Loren Hays, U.S. Fish and Wildlife Service, pers. comm., 1991).

Because the majority of snowy plover nesting sites occur in unstable sandy substrates, nest losses caused by weather-related natural phenomena commonly occur. Events such as extreme high tides (Wilson 1980, Stenzel et al. 1981, Warriner et al. 1986, Page 1988), river flooding (Stenzel et al. 1981), and heavy rain (Wilson 1980, Warriner et al. 1986, Page 1988) have been reported to destroy or wash away individual nests as well as entire colony sites. Wind driven sand contributes to nest failure by burying eggs (Wilson 1980, Stenzel et al. 1981, Warriner et al. 1986). The percentage of total nest losses attributed to weather-related phenomenon has varied from 15 to 38 percent (Wilson 1980, Warriner et al. 1986, Page 1988). Although natural phenomena contribute significantly to nest failures at some plover breeding sites, the significance of this factor on the overall coastal breeding population is unknown.

Artificial measures have been taken at several nesting sites to improve snowy plover nesting success. In 1991, the California Department of Parks and Recreation and the Service conducted plover nest enclosure studies on National Wildlife Refuge and State property in the Monterey area. Hatching success of plover nests in enclosures was 81 percent as compared to 28 percent for unprotected nests. (Richard G. Rayburn, California Department of Parks and Recreation, in litt., 1992, Elaine Harding-Smith, U.S. Fish and Wildlife Service, pers. comm., 1992). Use of nest enclosures at Coos Bay North Spit resulted in up to 88 percent nesting success, compared to as low as 9 percent success for unprotected nests (Stern et al. 1991b, Randy Fisher, in litt., 1992).

The Service has carefully assessed the best scientific and commercial information available regarding the past, present, and future threats faced by the Pacific coast population of the western

snowy plover in determining to make this final rule. Based on this evaluation, the preferred action is to list the Pacific coast population of the western snowy plover (*Charadrius alexandrinus nivosus*) as threatened. This population of the western snowy plover is threatened by loss and modification of nesting habitat resulting from encroachment of European beachgrass, extensive human recreational use of nesting areas, and human development of the coast. Predation, which is often exacerbated by human disturbance, poses a significant threat to a number of nesting colonies. Although only two western snowy plover nesting sites remain in Washington, and population declines in Oregon have been dramatic in recent years, the Service has decided to list the Pacific coast population of the western snowy plover as threatened. This decision is based on the fact that the center of the breeding range of this population is in California where numbers of breeding birds are greater and have not declined as dramatically. However, numerous unchecked threats and an ongoing, rangewide population decline indicate that the coastal population of the western snowy plover is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. Critical habitat is not determinable at this time for reasons discussed in the "Critical Habitat" section of this rule.

Critical Habitat

Section 4(a)(3) of the Act, as amended, requires that, to the maximum extent prudent and determinable, the Secretary designate critical habitat concurrently with determining a species to be endangered or threatened. The Service finds that critical habitat is not presently determinable for the Pacific coast population of the western snowy plover. The Service's regulations (50 CFR 424.12(a)(2)) state that critical habitat is not determinable if information sufficient to perform required analyses of the impacts of the designation is lacking or if the biological needs of the species are not sufficiently known to permit identification of an area of critical habitat. Critical habitat is defined as "specific areas within the geographical area currently occupied by a species * * * on which are found those physical or biological features essential to the conservation of the species and that may require special management considerations or protection * * *" (50 CFR 424.02(d)).

When prompt listing of a species is essential to its conservation, but sufficient information to perform required analyses of the impacts of the critical habitat designation is lacking, the Service may go forward with a final listing decision without designating critical habitat. In the case of the snowy plover, nesting birds (especially in Oregon and Washington) need immediate protection from take. A critical habitat determination, to the maximum extent prudent, must then be completed not later than 2 years from publication of the proposed rule. The Service is continuing to gather information to be used in these analyses.

The Service has received additional information specific to potential areas of snowy plover critical habitat. A study by Stern et al. (1990b) indicates that plover broods at several Oregon sites remain relatively close to nesting areas. Additional information is being sought from snowy plover experts, particularly in California, where many of the colony sites have not been studied as extensively.

The relative importance of specific wintering habitat sites to maintenance of the coastal population of the subspecies also may represent an additional consideration.

In addition, to analyze the economic impacts of a critical habitat designation, the Service must obtain information about the costs of such a designation over and above the costs associated with listing. The Service must have information on the possible increased costs associated with restrictions of public access to specific nesting or wintering areas, and associated secondary effects on recreational concessionaires, commercial fisheries, and industrial and residential development. Such information will be gathered by coordinating with the appropriate agencies and individuals.

Available Conservation Measures

Conservation measures provided to species listed as endangered or threatened under the Endangered Species Act include recognition, recovery actions, requirements for Federal protection, and prohibitions against certain activities. Recognition through listing encourages and results in conservation actions by Federal, State, and private agencies, groups, and individuals. The Endangered Species Act provides for possible land acquisition and cooperation with the States and requires that recovery actions be carried out for all listed species. The protection required of Federal agencies and the prohibitions against taking and harm are discussed, in part, below.

Section 7(a) of the Act, as amended, requires Federal agencies to evaluate their actions with respect to any species that is proposed or listed as endangered or threatened and with respect to its critical habitat, if any is being designated. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402. Section 7(a)(2) of the Act requires Federal agencies to insure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of a listed species or to destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into formal consultation with the Service.

Federal agencies that may be involved as a result of this listing are the Service, Bureau of Land Management, National Park Service, U.S. Forest Service, Federal Aviation Administration, and the Departments of the Army (including the Corps of Engineers (Corps)), Navy, and Air Force. In California, approximately 34 percent of the breeding plover population occurs on Federal lands (J.P. Myers, in litt., 1988). At least 50 percent of breeding habitat is under Federal agency jurisdiction in Oregon (J.P. Myers, in litt., 1988). In Washington, the breeding site at Leadbetter Point is within a National Wildlife Refuge.

On most Federal land containing active breeding sites, few measures have been implemented specifically to protect snowy plovers. In a few areas in California, including the Marine Corps Base at Camp Pendleton, plovers have benefitted somewhat from protective measures taken for the endangered California least tern (*Sterna antillarum brownii*). At Vandenberg Air Force Base in southern California, beaches are closed to all foot and vehicular traffic during the California least tern nesting season (Donna Brewer, U.S. Fish and Wildlife

Service, pers. comm., 1991). Dogs and cattle have been restricted from some beaches at Point Reyes National Seashore (Gary Page, pers. comm., 1991), and some beaches on Federal land in Oregon have been closed to vehicles to protect plovers and other wildlife (Charles Bruce, pers. comm., 1991). Leadbetter Point in Washington (Fish and Wildlife Service), a 5-acre spoil disposal site in Coos Bay (Bureau of Land Management), and a 25-acre spoil disposal site in Coos Bay (Corps of Engineers) are the only nesting sites where human access is restricted specifically for plover nesting. At the Siuslaw National Forest, the Forest Service has established Forest-wide standards and guidelines for the snowy plover. These guidelines include area closures through signing, public education, prohibitions against loss or degradation of habitat, provisions for habitat enhancement, and monitoring. Most other nesting areas on Federal land, with the exception of military bases, have unrestricted human access all year. In Oregon, the Corps of Engineers is proposing two projects to create or improve plover nesting habitat using dredged spoils. Access improvements for recreational purposes are ongoing at several beaches on Federal land. At Coos Bay, Oregon, where the largest coastal Oregon plover colony occurs, several recreational facilities, including off-road vehicle access and campgrounds are proposed on Bureau of Land Management land (Bureau of Land Management 1989). The Bureau of Land Management at Coos Bay also is considering a proposed land exchange that would involve moving a snowy plover nesting site to a new location created with dredged spoils.

Because human disturbance is a primary factor affecting snowy plover reproductive success, any of the above mentioned Federal agencies would be required to consult with the Service if any action they fund, authorize, or carry out may affect the coastal population of the western snowy plover.

As discussed above, some western snowy plover nesting and wintering habitat may be regulated by the Corps of Engineers under section 10 of the Rivers and Harbors Act and section 404 of the Clean Water Act. If a proposed project may affect the western snowy plover, the Corps would be required to consult with the Service under section 7 of the Act.

The Act and implementing regulations found at 50 CFR 17.31 set forth a series of general prohibitions and exceptions that apply to all threatened wildlife not covered by a special rule. These prohibitions, in part, make it illegal for any person subject to the jurisdiction of the United States to take (including harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt any such conduct), import or export, transport in interstate or foreign commerce in the course of commercial activity, or sell or offer for sale in interstate or foreign commerce any listed species. It also is illegal to possess, sell deliver, carry, transport, or ship any such wildlife that has been taken illegally. Certain exceptions apply to agents of the Service and State conservation agencies.

Permits may be issued to carry out otherwise prohibited activities involving threatened wildlife species under certain circumstances. Regulations governing permits are at 50 CFR 17.32. Such permits are available for scientific purposes, to enhance the propagation or survival of the species, and/or for incidental take in connection with otherwise lawful activities. For threatened species, there are also permits for zoological exhibition, educational purposes, or special

purposes consistent with the purposes of the Act.

The Service will review the Pacific coast population of the western snowy plover to determine whether it should be placed upon the Annex of the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere, which is implemented through section 8(A)(e) of the Act, and whether it should be considered for other appropriate international agreements.

National Environmental Policy Act

The Fish and Wildlife Service has determined that an Environmental Assessment or Environmental Impact Statement, as defined under the authority of the National Environmental Policy Act of 1969, need not be prepared in connection with regulations adopted pursuant to section 4(a) of the Endangered Species Act of 1973, as amended. A notice outlining the Service's reasons for this determination was published in the Federal Register on October 25, 1983 (48 FR 49244).

References Cited

A complete list of all references cited herein is available upon request from the Field Supervisor, Sacramento Field Office, U.S. Fish and Wildlife Service, 2800 Cottage Way, Room E-1803, Sacramento, California 95825-1846.

Authors

The primary author of this rule is Karen J. Miller, U.S. Fish and Wildlife Service, Ecological Services, Sacramento Field Office, 2800 Cottage Way, Room E-1803, Sacramento, California 95825-1846 (916/978-4866).

\$65:\$%\$?\$%List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, and Transportation.

Regulation Promulgation

Accordingly, part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, is amended as set forth below:

PART 17 -- [AMENDED]

1. The authority citation for part 17 continues to read as follows:

Authority: 16 U.S.C. 1361-1407; 16 U.S.C. 1531-1544; 16 U.S.C. 4201-4245; Pub. L. 99-625, 100 Stat. 3500, unless otherwise noted.

2. Amend Sec. 17.11(h) by adding the following, in alphabetical order under Birds, to the List of Endangered and Threatened Wildlife:

Sec. 17.11 -- Endangered and threatened wildlife

* * * * *

(h) * * *

Birds

Species

Common name	Plover, Western snowy
Scientific name	Charadrius alexandrinus nivosus
Historic range	U.S.A. (CA, OR, WA, NV, AZ, UT, CO, NM, TX, OK, KS); Mexico
Vertebrate population where endangered or threatened	U.S.A. (CA, OR, WA); Mexico (BC) (Within 50 miles of the Pacific coast)
Status	T
When listed	493
Critical habitat	NA
Special rules	NA

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Predator Damage Management Methods

Predator Damage Management Methods Available for Use. A variety of methods are used by APHIS-WS personnel in predator damage management. APHIS-WS employ three general strategies to reduce wildlife damage: resource management, physical exclusion, and wildlife management. Each of these approaches is a general strategy or recommendation for addressing predator damage situations. Most predator damage management methods have recognized strengths and weaknesses relative to each damage situation. APHIS-WS personnel can determine for each unique situation what method or combination of methods is most appropriate and effective using the WS Decision Model (Slate et al. 1992).

All predator damage management methods have limitations which are defined by the circumstances associated with individual wildlife damage problems. APHIS-WS considers a wide range of limitations as they apply the decision making process to determine what method(s) to use to resolve each damage problem (USDA 1997a, revised). Examples of limitations which must be considered and criteria to evaluate various methods are presented in USDA (1997a, revised, Appendix N) and in the following discussions.

Resource Management. Resource management includes a variety of practices that may be used by resource managers or owners to reduce the potential for predator damage. Implementation of these practices is appropriate when the potential for or actual damage can be reduced without significantly increasing a resource manager owner's costs or diminishing a person's ability to manage resources pursuant to their goals.

Habitat Management. Just as habitat management is an integral part of other wildlife management programs, it also plays an important role in predator damage management. The type, quality, and quantity of habitat is directly related to the animals attracted to an area and what the habitat can support. Therefore, habitat can be managed so that it does not produce or attract certain species or it repels them. Limitations of habitat management as a method of controlling wildlife damage are determined by the characteristics of the species involved, the nature of the damage, economic feasibility, and other factors. Removing non native beach grass to discourage predators is an integral part of past, present, and future plover recovery efforts.

Physical Exclusion. Physical exclusion methods restrict the access of wildlife to resources. Nest enclosures are used to protect nesting plovers from predation. The enclosures must encompass the sides and top of the structure, and be buried into the sand to help prevent burrowing, climbing and flying predators from entering the enclosures. These methods provide a means of appropriate and effective prevention of damage in some situations.

Wildlife Management. Reducing wildlife damage is achieved with many different techniques. The objective of this approach is to alter the behavior or population of the target animal, thereby eliminating or reducing the potential for loss or damage.

Frightening Devices. Frightening devices include distress calls, pyrotechnics, propane cannons, flags, and reflective tape. The success of frightening methods depends on the animal's fear of and subsequent aversion to the stimuli. Once animals become habituated to a stimulus, they often resume their damaging activities. Persistent efforts are usually required to consistently apply frightening techniques and to vary them sufficiently to prolong their effectiveness. In many situations animals frightened from one location become a problem at another. Some frightening devices may have negative effects on non-target wildlife, including T&E species. Frightening devices will probably have severe limitations in protecting plovers since they may affect plovers as much as the target species. The use of some frightening devices and techniques in urban and suburban environments may be considered aesthetically displeasing such as netting over trees or a nuisance by some persons such as the noise from propane cannons. The continued success of these methods frequently requires reinforcement by limited shooting (see shooting).

Pyrotechnics. Pyrotechnics consist of a variety of noise making devices in the form of fireworks. Double shotgun shells, known as shell-crackers or scare cartridges, are 12-gauge shotgun shells containing a firecracker that is projected up to 75 yards before exploding. Noise bombs, whistle bombs, racket bombs, and rocket bombs are fired from 15 millimeter flare pistols. They are used similarly to shell-crackers, but are projected for shorter distances. Noise bombs (also called bird bombs) are firecrackers that travel about 75 feet before exploding. Whistle bombs are similar to noise bombs, but whistle in flight and do not explode. They produce a noticeable response because of the trail of smoke and fire, as well as the whistling sound. Racket bombs make a screaming noise in flight and do not explode. Rocket bombs are similar to noise bombs but may travel up to 150 yards before

exploding. These pyrotechnics are often used to frighten birds away from crops, roosting locations, or runways. The shells are fired so that they explode in front of, or underneath, flocks of birds attempting to enter crop fields, roosts, or the air operating area at an airport. The purpose is to produce an explosion between the birds and their objective. Birds already in a crop field or at an airport can be frightened away, but it is extremely difficult to disperse birds that have already settled in a roost.

A variety of other pyrotechnic devices, including firecrackers, rockets, and Roman candles, are used for dispersing animals. The discharge of pyrotechnics may be inappropriate and prohibited in some area such as urban and suburban communities. Pyrotechnic projectiles can start fires, ricochet off buildings, pose traffic hazards, cause some dogs to bark incessantly, and injure and annoy people. Pyrotechnics may cause fear or alarm in urban areas as the sound of discharge sometimes resembles gunfire.

Propane Exploders. Propane exploders operate on propane gas and are designed to produce loud explosions at controlled intervals. They are strategically located (elevated above the vegetation, if possible, and hidden) in areas of high wildlife use to frighten wildlife from the problem site. Because animals are known to habituate to sounds, exploders must be moved frequently and used in conjunction with other scare devices or reinforced with lethal methods. Exploders can be left in an area after dispersal is complete to discourage animals from returning. However, propane exploders are generally inappropriate for use in urban areas due to the repeated loud explosions which many people consider an unacceptable nuisance.

Scarecrows. Since personnel is often limited, the use of scarecrows can be effective when people are not present at a field. The human effigy is still one of the best scarecrows available. These work best with eyes on both sides of the head and dressed in clothes similar to the clothes worn by people that are harassing the birds. Other scarecrows are available such as "scare-eye" balloons. As with other techniques, scarecrows work best when the number is varied, a variety of scarecrows are used, and they are moved often.

Flagging. Flags may have limited effectiveness in frightening birds. Anecdotal reports indicate black flagging may be effective at repelling some birds.

Bioacoustics. Distress and alarm calls of various animals have been used singly and in conjunction with other scaring devices to successfully scare or harass animals. Many of these sounds are available on records and tapes. Calls should be played back to the animals from either fixed or mobile equipment in the immediate or surrounding area of the problem. Animals react differently to distress calls; their use depends on the species and the problem. Calls may be played for short (few second) bursts, for longer periods, or even continually, depending on the severity of damage and relative effectiveness of different treatment or "playing" times.

Chemical Repellents. Chemical repellents are compounds that prevent the consumption of food items or use of an area. They operate by producing an undesirable taste, odor, feel, or behavior pattern. Effective and practical chemical repellents should be: nonhazardous to wildlife; nontoxic to plants, seeds, and humans; resistant to weathering; easily applied; reasonably priced; and capable of providing good repellent qualities. The reaction of different animals to a single chemical formulation varies, and for any species there may be variations in repellency between different habitat types. Development of chemical repellents is expensive and cost prohibitive in many situations. Chemical repellents are strictly regulated, and suitable repellents are not available for many wildlife species or wildlife damage situations. Naphthalene (moth balls) has proven to be ineffective as a bird repellent (Dolbeer et al. 1988).

Aversive Agents. Methiocarb, active ingredient in Mesurol, can be useful as an aversive conditioning agent, used in eggs, in reducing raven predation of colonial waterbirds (Avery et al. 1995). Mesurol is an aversive conditioning egg treatment registered with the EPA to reduce predation on the eggs of protected, threatened or endangered species. Mesurol is only available for use under APHIS-WS program supervision (see product label, Appendix D). After prebaiting, a limited number of treated eggs would be distributed within the nesting colony. To reduce risk to humans, non-target animals and pets, a blind would be established during treated egg baiting periods so treated egg sites can be observed. In addition, eggs would be wired to the ground so they can not be removed from the site, and thus would be consumed on site. Treated eggs would be removed from bait

sites when the observer is not present. When used according to label directions, methiocarb will not pose unreasonable risks or adverse effects to humans or the environment (USEPA 1994, Mesuro I Label Appendix D).

Take Methods.

Chemical Immobilizing and Euthanizing Agents. Most APHIS-WS Specialists in Oregon are trained and certified to use drugs for capturing or euthanizing wildlife. Drugs such as sodium phenobarbital derivatives are used for euthanasia. Most drugs, an exception is alpha-chloralose, fall under restricted-use categories and must be used under the appropriate license from the U.S. Department of Justice, Drug Enforcement Agency. The drugs used by APHIS-WS are approved by a Drug Committee panel.

Euthanasia. Captured animals may be euthanized. The euthanasia method used is dependent on whether the animal is going to be processed for human consumption. Animals that are not going to be consumed can be euthanized with a sodium phenobarbital solution such as Beuthanasia-D® or other appropriate method such as cervical dislocation, decapitation, a shot to the brain, or asphyxiation. CO₂ is sometimes used to euthanize animals which are captured in live traps and when relocation is not a feasible option.

Relocation. Most damaging species are common and numerous throughout Oregon, so they are rarely, if ever, relocated because habitats in other areas are generally already occupied. Relocation of damaging species to other areas following live capture generally would not be biologically sound, effective nor cost-effective. Relocation of wildlife often involves stress to the relocated animal, poor survival rates, and difficulties in adapting to new locations or habitats. Relocation of target animals involved in conflicts is usually not recommended according to State wildlife policy.

Leg-hold traps are used to capture animals such as coyotes, bobcats, fox, mink, raccoon and skunk. These traps are the most effective, versatile and widely used tool available to APHIS-WS for capturing many species. Traps placed in the travel lanes of the target animal, using location rather than attractants, are known as "blind sets." More frequently, traps are placed as "baited" or "scented" sets. These trap sets use an attractant consisting of the animal's preferred food or some other lure such as fetid meat, urine, or musk to attract the animal into the trap.

In some situations, a carcass or large piece of meat (i.e., a draw station) may be used to attract target animals to an area where traps are set. In this approach, single or multiple trap sets are placed at least 30 feet from the draw station. APHIS-WS program policy prohibits placement of traps or snares within 30 feet of a draw station to prevent the capture of non-target scavenging birds. There are only two exceptions to this policy. One is when setting leg-hold traps to capture cougars returning to a kill. In these cases the weight of the target animal allows pan-tension adjustments which preclude the taking of small non-target animals. The second exception is when leg-hold traps are set next to carcasses used to capture raptors under permit with the USFWS.

Two primary advantages of the leg-hold trap are that they can be set under a wide variety of conditions, and that pan-tension devices can be used to prevent smaller animals from springing the trap, thus allowing a degree of selectivity not available with many other methods. Effective trap placement by trained personnel greatly contributes to the leg-hold trap's selectivity. Another advantage of leg-hold traps is that the live-capture of animals permits release if warranted.

Disadvantages of using leg-hold traps include the difficulty of keeping them in operation during rain, snow, or freezing weather. In addition, they lack selectivity where non-target species are of similar size to target species and are abundant. The selectivity of leg-hold traps is an important issue and has been shown to be a function of how they are used. The type of set and attractant used significantly influences both capture efficiency and the risk of catching non-target animals. The use of leg-hold traps in the APHIS-WS program is costly due to the amount of manpower and time involved; however, the technique is indispensable in selectively resolving many animal damage situations.

APHIS-WS program guidelines require warning signs to be posted in the vicinity of control

operations. Placement is generally confined to areas not visible to or frequently visited by the public. APHIS-WS personnel are the most vulnerable to hazard exposures (USDA 1997a, revised).

Snares. Snares, made of cable, are among the oldest existing wildlife damage management tools. Snares can be used to catch most species. They offer the advantage of being much lighter than leg-hold traps and are not as affected by inclement weather.

Snares are used wherever a target animal moves through a restricted lane of travel (i.e., "crawls" under fences, trails through vegetation, den entrances, etc.). When an animal moves forward into the snare loop, the noose tightens and the animal is held.

Snares can be set as either lethal or live-capture devices. Snares set to capture an animal around the neck can be a lethal use of the device, whereas snares positioned to capture the animal around the body or leg can be a live-capture method. Careful attention to details in placement of snares and the use of slide stops can also allow for the live-capture of neck-snared animals.

The catch pole snare is used to capture or handle problem animals. Catch poles are primarily used to remove live animals from traps without injury to the animal or danger to the APHIS-WS Specialist.

Human safety hazards associated with snares are similar to leg-hold traps. Risks are minimized by limiting or avoiding use where the public may be exposed, and by program guidelines that require warning signs to be posted in the vicinity of control operations (USDA 1997a, revised).

Cage Traps. Cage traps are frequently used to capture skunks, raccoons, cougars, and black bears. Cage traps can also be used to capture coyote pups, fox, and dogs. Cage traps capture the animal by mechanical closure of the entry way via the animal's actuation of a triggering device. Cage traps commonly used or recommended by APHIS-WS to capture skunks and raccoons are drop-door wire box traps. Live traps are generally baited with food items as attractants.

The use of cage traps allows the release of captured non-target animals or target animals that are to be relocated. Cage traps are frequently recommended to private individuals for capturing skunks and raccoons or used operationally by APHIS-WS personnel in situations where other methods may not be as safe. These devices pose minimal risk to the humans, pets, or non-target animals, and are easily monitored and maintained. However, some animals fight to escape from cage traps and become injured. However, live traps, as applied and used by APHIS-WS pose no danger to pets or the public and if a pet is accidentally captured in such traps, it can be released unharmed.

Shooting Birds. Shooting is more effective as a dispersal technique than as a way to reduce bird densities when large number of birds are present. Shooting is a very individual specific method and is normally used to remove a single offending bird. Shooting to supplement harassment typically enhances the effectiveness of harassment techniques and can help prevent bird habituation to hazing methods (Kadlec 1968). In situations where the feeding instinct is strong, most birds quickly adapt to scaring and harassment efforts unless the control program is periodically supplemented by shooting. Shooting can be relatively expensive because of the staff hours sometimes required (USDA 1997a, revised). It is selective for target species and may be used in conjunction with decoys and calling. Shooting with shotguns, air rifles, or rim and center fire rifles is sometimes used to manage bird damage when lethal methods are determined to be appropriate. The birds are killed as quickly and humanely as possible. APHIS-WS personnel follow all firearm safety precautions when conducting bird damage management and comply with all laws and regulations governing firearms use. Also see "Shooting Mammals" for human safety consideration.

Firearm use is very sensitive and a public concern from general safety issues relating to the public to misuse. To ensure safe use and awareness, APHIS-WS employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program within 3 months of their appointment and a refresher course every 3 years afterwards (WS Directive 2.615). WS employees who carry firearms as a condition of employment, are required to sign a form certifying that they meet the criteria as stated in the *Lautenberg Amendment* which prohibits firearm possession by anyone who has been convicted of a misdemeanor crime of domestic violence.

Shooting mammals. Shooting is selective for the target species but is relatively expensive due to the staff hours required. Shooting is, nevertheless, an essential wildlife damage management method. Removal of one or two problem animals can quickly stop extensive damage. Predator calling is an integral part of ground hunting. Trap-wise predators, while difficult to trap, are often vulnerable to calling. Shooting can be selective for offending individuals and has the advantage that it can be applied in specific damage situations.

The primary human health and safety hazard associated with shooting is related to firearms handling by the user, making APHIS-WS personnel the most vulnerable. Human health and safety risks are minimized by program safety practices which include: extensive training and experience in safe and effective firearms use; frequent employee evaluations; and use of firearms only at safe distances from human habitations or other activities, and in safe directions only (USDA 1997a, revised).

Egg, Nest, and Hatchling Removal and Destruction. Egg and nest destruction is used mainly to reduce or limit the growth of a nesting population in a specific area through limiting reproduction of offspring or removal of nest to other locations. Egg and nest destruction is practiced by manual removal of the eggs or nest. This method is practical only during a relatively short time interval and requires skill to properly identify the eggs and hatchlings of target species.

Denning. Denning is the practice of seeking out the dens of depredating coyotes or red fox and eliminating the young, adults, or both to stop ongoing predation or prevent further depredations. The usefulness of denning as a damage management method is proven, however since locating dens is difficult and time consuming, and den usage is restricted to about 2 to 3 months of the year, its use is limited to specific, appropriate situations that must be determined by a specialist.

Coyote and red fox depredations often increase in the spring and early summer due to the increased food requirements of rearing and feeding young. Removal of pups will often stop depredations even when the adults are not removed. When the adults are removed and the den site is known, the pups are killed to prevent their starvation. The pups are euthanized in the den with a registered fumigant. Denning is highly selective for the target species responsible for damage. Den hunting for adult coyotes and fox is often combined with other activities (i.e., calling and shooting, etc.).

Den fumigants, also called gas cartridges, are fumigants, or gases, used to manage wildlife. They are highly effective but are expensive and labor intensive to use. In the APHIS-WS program, fumigants are only used in predator dens. The APHIS-WS program manufactures and uses den cartridges specifically formulated for this purpose. These cartridges are hand placed in the active den, and the entrance is tightly sealed with soil. The burning cartridge causes death from a combination of oxygen depletion and carbon monoxide poisoning.

Chemical Toxicants. All chemicals used by APHIS-WS are registered under FIFRA (administered by EPA and ODA) or by the Food and Drug Administration. APHIS-WS personnel that use chemical methods are certified as pesticide applicators by ODA and are required to adhere to all certification requirements set forth in FIFRA and Oregon pesticide regulations. Chemicals are only used on private, public, or Tribal property sites with authorization from the property owner or manager.

DRC-1339. DRC-1339 is a slow acting avicide that is registered with the EPA for use on a number of species (e.g. ravens, crows, pigeons, gulls, blackbirds, and starlings), on various bait carriers, such as grain, meat baits, sandwich bread, and cull french fries. DRC-1339 is only available for use under APHIS-WS program supervision. Under project conditions, DRC-1339 is available for use according to label directions for corvids and gulls (see product label, Appendix D). DRC-1339 was developed as an avicide because of its differential toxicity to mammals. DRC-1339 is highly toxic to sensitive species but only slightly toxic to non-sensitive birds, predatory birds, and mammals. Most bird species that are responsible for damage, including starlings, blackbirds, pigeons, crows, magpies, and ravens are highly sensitive to DRC-1339. Many other bird species such as raptors, sparrows, and eagles are classified as non-sensitive. Numerous studies show that DRC-1339 poses minimal risk of primary poisoning to non-target and T&E species (USDA 1997 revised). Secondary poisoning has not been observed with DRC-1339 treated baits. This can be attributed to relatively low toxicity to species that might scavenge on birds killed by DRC-1339 and its tendency to be

almost completely metabolized in the target birds which leaves little residue to be ingested by scavengers. Secondary hazards of DRC-1339 are almost non-existent. DRC-1339 acts in a humane manner producing a quiet and apparently painless death.

DRC-1339 is unstable in the environment and degrades rapidly when exposed to sunlight, heat, or ultra violet radiation. DRC-1339 is highly soluble in water, but does not hydrolyze, and degradation occurs rapidly in water. DRC-1339 tightly binds to soil and has low mobility. The half life is about 25 hours, which means it is nearly 100 percent broken down within a week, and identified metabolites (i.e. degradation chemicals) have low toxicity. Aquatic and invertebrate toxicity is low (USDA 1997 revised). USDA (1997 revised, Appendix P) contains a thorough discussion and risk assessment of DRC-1339. That assessment concluded that no adverse effects are expected from use of DRC-1339.

Zinc Phosphide. Zinc phosphide pellets (2 percent) may be used only by certified applicators, or persons under their direct supervision, for Norway rats, roof rats, and house mice (see product label, Appendix D). In the project area, the bait must be placed in tamper resistant bait stations or in burrows, since non-target hazards exist to any granivorous birds or mammals that occur in areas where zinc phosphide grain bait is applied (USDA 1997a, revised). The Aleutian Canada goose would potentially be affected by zinc phosphide if allowed to consume treated grains. Zinc phosphide poses little secondary risk to non-target wildlife since it breaks down rapidly in the digestive tract of affected animals. Domestic dogs and cats are more susceptible than other animals (USDA 1997a, revised).

Mitigation in Standard Operating Procedures

Mitigation measures are any features of an action that serve to prevent, reduce, or compensate for impacts that otherwise might result from that action. The current APHIS-WS program, nationwide and in Oregon, uses many such mitigation measures and these are discussed in detail in Chapter 5 of (USDA (1997a, revised). The key mitigating measures incorporated into all alternatives, including Alternative 2 (No Action), as appropriate, and considered APHIS-WS Standard Operating Procedures (SOP) include:

- ◆ Technical Assistance and education is stressed in each control program so that property and resource managers can learn ways to avoid attracting nuisance animals, and so that the public might be more willing to cooperate with recovery efforts.
- ◆ Non-lethal capture methods such as cage traps are predominantly used where the public might be exposed (near houses or high use recreation areas) so that any non-target animals such as pets may be released unharmed.
- ◆ Conspicuous, bilingual warning signs alerting people to the presence of leg-hold traps, and snares are placed at major access points when they are set in the field.
- ◆ All APHIS-WS Specialists who use restricted chemicals and immobilization or euthanasia drugs are trained and certified by program personnel or other experts in the safe and effective use of these materials.
- ◆ Research continues to improve the selectivity and humaneness of management devices.
- ◆ Padded-jaw leg-hold traps are used help reduce physical injury to target and non-target species.
- ◆ Traps are checked daily or more frequently and covered on weekends or removed to minimize stress and injury to trapped animals.
- ◆ Feral cats are provided to local animal control authorities according to county ordinances for shelter adoption or euthanization.
- ◆ All pesticides that may be used would be registered with EPA and ODA. EPA approved label directions are followed by APHIS-WS employees.
- ◆ The APHIS-WS Decision Model (Slate et al. 1992) is designed to identify effective wildlife damage management strategies and their impacts.
- ◆ APHIS-WS employees that use pesticides are trained to use each specific material and are certified for the use of pesticides under EPA and ODA approved programs.
- ◆ APHIS-WS employees who use pesticides participate in continuing education programs to keep abreast of developments and to maintain their certifications.
- ◆ APHIS-WS consulted with the USFWS regarding the nationwide program and has implemented all reasonable and prudent alternatives to protect T&E species. APHIS-WS has adopted all reasonable and prudent alternatives applicable to the program.
- ◆ The USFWS will issue a BO for the Pacific coast western snowy plover predator damage management program. The full text will be included in the final EA. All terms and conditions stipulated in the BO shall be incorporated into the selected alternative to minimize harm to threatened and endangered species.
- ◆ Currently, no work is proposed on Tribal lands. If plover recovery work becomes necessary on or adjacent to tribal lands, the lead agencies would consult with the Tribal leadership to identify and resolve any issues of concern to the Tribes.
- ◆ Wildlife damage management activities are directed towards resolving problems by taking action against individual problem animals, or local populations.

- ◆ APHIS-WS take is monitored by considering total animals removed and estimated population numbers or population trends of key species. These data are used to assess cumulative affects so as to maintain the magnitude of harvest below the level that would impact the viability of a population.
- ◆ The lead and cooperating agencies have cooperated in the development of this EA and will continue to closely coordinate activities to implement any resulting decision from this EA. In this way, management agencies are fully informed and involved in identifying and resolving any potential program impacts.
- ◆ The APHIS-WS program is conducted under Cooperative Agreements and MOUs. National MOUs with the BLM and USFS delineate expectations for wildlife damage management on public lands administered by these agencies. APHIS-WS work plans are developed with BLM and USFS offices to detail the activity, target species, and mitigation measures to be implemented where wildlife damage management is needed.
- ◆ All pesticide use approval authority on National Forest Service lands resides with the Forest Service, including uses proposed by other Federal agencies (Forest Service Manual 2152)

Pesticide Labels